DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-5, 7-9 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (US 6,246,524) or Yamazaki et al (US 6,291,320) in view of Okamoto et al (JP 2003-287704), and Ogawa et al (US 7,753,548) or Sakai et al (US 2003/0063630).

Tanaka or Yamazaki shows the method and apparatus claimed including a laser oscillator emitting a laser beam, a beam homogenizer for homogenizing the laser into a second beam wherein the second beam passes through a first condensing lens and second condensing lens wherein the second lens is in a conjugate relation with a irradiation surface where the second beam enters the irradiation surface. Tanaka or Yamazaki shows the beam homogenizer that is in form of a cylindrical lens array and the condensing lens that are convex cylindrical lens. Tanaka further shows that the laser can be a gas laser such as an Ar laser or a solid-state laser such as a YAG laser wherein the second beam is moved with respect to the irradiation surface, and Tanaka also shows the applications of its laser irradiation method in the video camera, a digital camera, and among other uses. But, Tanaka and Yamazaki do not show that the laser

is a solid-state laser having the spectral width of .1 nm or lager and that the solid-state oscillator includes a crystal of ceramic.

Okamoto shows the method and apparatus claimed including a silicon film irradiate with a laser having a solid-state laser oscillator such as a Nd:YAG laser having a laser beam with a spectral width of 0.1 nm or more into a second beam after passing through a beam homogenizer which includes a homogenizer such as cylindrical lens array wherein the second beam is condensed with a condensing lens into a third beam that is irradiated on an irradiation surface. The irradiated beam is moved relative to the irradiation surface of the film.

Ogawa or Sakai shows that a solid-state laser using Nd ion or Yb ion doped crystal an excitation medium is well known in the art.

In view of Okamoto, it would have been obvious to one of ordinary skill in the art to adapt Tanaka or Yamazaki with the solid-state laser having the recited spectral width that is well known in the art as an alternative laser oscillator that can provide a suitable alternative laser beam for a uniform laser irradiation; and in view of Ogawa or Sakai, it would have been obvious to adapt Tanaka or Yamazaki with the laser oscillator having a ceramic crystal that is Nd ion or Yb doped crystal as the laser emitting medium which is well known in the art.

With respect to the recitation of forming a crystal grain grown continuously in a moving direction, it is noted that such formation of the crystal grain would have been obvious result or predictable result to the irradiation surface by the modified laser beam

of Tanaka or Yamazaki in view of Okamoto as matter of routine process of the laser irradiation which also meets the recited method steps.

With respect to the recite slit, Tanaka shows a slit 205 wherein the beam projecting from the slit can be a third laser beam that passes through a condensing lens and a projection lens, such as the second condensing lens, that is in a conjugate relation with the irradiation surface.

3. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka '524 or Yamazaki in view of Okamoto, and Ogawa or Sakai, as applied to claims 1, 3-5, 7-9 and 11-16 above, and further in view of Gu et al (US 7,723,642).

Tanaka '524 or Yamazaki in view of Okamoto, and Ogawa or Sakai, shows the method and apparatus claimed except for a first mode-locked pulsed beam emitted from a solid state laser.

Gu shows that it is well known in the art to provide a solid state oscillator that emits a mode-locked pulse beam wherein such laser is known to produce high power density and high repetition rates.

In view of Gu, it would have been obvious to one of ordinary skill in the art to adapt Tanaka '524 or Yamazaki, as modified by Okamoto, and Ogawa or Sakai, with the mode-locked laser as alternative laser oscillator that it is well known in the art as a suitable laser oscillator that can also provide high power density and repetition rates.

4. Claims 6, 17, 19, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka '524 or Yamazaki in view of Okamoto, and Ogawa or Sakai,

as applied to claims 1, 3-5, 7-9 and 11-16 above, and further in view of Tanaka et al (US 6,545,248).

Tanaka '524 or Yamazaki in view of Okamoto, and Ogawa or Sakai, shows the method and apparatus claimed except for the laser beam that is converted by a non-linear optical element.

Tanaka '248 shows that it is well known in the art to provide a non-linear optical element to convert a fundamental into a second harmonic.

In view of Tanaka '248, it would have been obvious to one of ordinary skill in the art to adapt Tanaka '524 or Yamazaki, as modified by Okamoto, and Ogawa or Sakai, with a non-linear optical element to produce a fundament wavelength to into a harmonic wavelength that further provide a more uniform energy laser beam.

5. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka '524 or Yamazaki in view of Okamoto, and Ogawa or Sakai, and Gu as applied to claims 2 and 10 above, and further in view of Tanaka et al (US 6,545,248).

Tanaka '524 or Yamazaki in view of Okamoto, Ogawa or Sakai, and Gu shows the method and apparatus claimed except for the laser beam that is converted by a non-linear optical element.

Tanaka '248 shows that it is well known in the art to provide a non-linear optical element to convert a fundamental into a second harmonic.

In view of Tanaka '248, it would have been obvious to one of ordinary skill in the art to adapt Tanaka '524 or Yamazaki, as modified by Okamoto, Ogawa or Sakai, and

Gu, with a non-linear optical element to produce a fundament wavelength to into a harmonic wavelength that further provide a more uniform energy laser beam.

Response to Arguments

6. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SANG Y. PAIK whose telephone number is (571) 272-4783. The examiner can normally be reached on M-F (9:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on (571) 272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SANG Y PAIK/

Primary Examiner, Art Unit 3742